

83. (Amended) The [milk] method of claim 82, wherein the human polypeptide is lactoferrin.

98. (Amended) The method of claim 125, wherein the promoter is [A transgenic bovine having a genome containing a transgene comprising:]

a bovine α -s1 casein promoter; and the enhancer is a
a bovine α -s1 casein enhancer[;

a secretory DNA sequence encoding a signal sequence functional in bovine mammary secretory cells;

a recombinant DNA sequence encoding a recombinant polypeptide, the secretory DNA sequence being operably linked to the recombinant DNA sequence, wherein a secretory recombinant DNA sequence is formed, the secretory-recombinant DNA sequence being operably linked to the bovine α -s1 promoter and enhancer;

wherein the transgene, in a lactating form of the bovine or a female descendant of the bovine, is capable of directing the expression of the secretory-recombinant DNA sequence in bovine mammary secretory cells to produce a form of recombinant polypeptide, that when secreted from the mammary secretory cells produces the recombinant polypeptide in the milk of the bovine or female descendant thereof].

99. (Amended) The [transgenic bovine] method of claim 98, wherein the transgene further comprises:

an α -s1 casein 3' untranslated sequence.

100. (Amended) The [transgenic bovine] method of claim 99, wherein the transgene further comprises an α -s1 casein 3' flanking sequence.

101. (Amended) The [transgenic bovine] method of claim 100, wherein the α -s1 casein 3' flanking sequence has a length of at least 2 kb.

102. (Amended) The [transgenic bovine] method of claim 101, wherein the transgene further comprises at least 16 kb of α -s1 casein 5' flanking sequence.

103. (Amended) The [transgenic bovine] method of claim 102, wherein the transgene further comprises an intronic sequence.

104. (Amended) The [transgenic bovine] method of claim 103, wherein the intronic sequence is a hybrid intronic sequence.

105. (Amended) The [transgenic bovine] method of claim 104, wherein the hybrid intronic sequence comprises a 5' portion of a bovine α -S1 casein intronic sequence and a 3' portion of an IgG heavy chain intronic sequence.

106. (Amended) The [transgenic bovine] method of claim 105 wherein the 3' portion is a 3' splice signal sequence associated with the J-C segment rearrangement of an IgG heavy chain.

107. (Amended) The [transgenic bovine] method of claim 106, wherein the recombinant polypeptide is a homologous polypeptide from the bovine.

108. (Amended) The [transgenic bovine] method of claim 106, wherein the recombinant polypeptide is a heterologous polypeptide.

109. (Amended) The [transgenic bovine] method of claim 108, wherein the heterologous polypeptide is selected from the group consisting of human milk proteins, human serum proteins, and industrial enzymes.

110. (Amended) The [transgenic bovine] method of claim 109, wherein the heterologous polypeptide is a human milk protein.

111. (Amended) The [transgenic bovine] method of claim 110, wherein the human milk protein is selected from the group consisting of secretory immunoglobulins, lysozyme, lactoferrin, lactoglobulin, α -lactalbumin and bile salt-stimulated lipase.

112. (Amended) The [transgenic bovine] method of claim 111, wherein the milk protein is lactoferrin or lysozyme.

113. (Amended) The [transgenic bovine] method of claim 108, wherein the heterologous polypeptide is a human serum protein.

114. (Amended) The [transgenic bovine] method of claim 113, wherein the human serum protein is selected from the group consisting of albumin, immunoglobulin, Factor VIII, Factor IX and Protein C.

115. (Amended) The [transgenic bovine] method of claim 114, wherein the serum protein is albumin.

116. (Amended) The [transgenic bovine] method of claim 108, wherein the heterologous polypeptide is an industrial enzyme selected from the group consisting of proteases, lipases, chitinases and ligninases.

117. (Amended) The [transgenic bovine] method of claim 106, wherein the recombinant polypeptide is a naturally occurring polypeptide.

118. (Amended) The [transgenic bovine] method of claim 98, wherein the transgene is the 26 kb NotI fragment of plasmid p26,8h1F4.

123. (Amended) A method of producing a transgenic bovine species the method comprising:

obtaining an ovum from bovine ovaries;
maturing and fertilizing the ovum *in vitro* to form a zygote;
introducing a transgene into the zygote *in vitro*;
propagating the zygote to form the embryo *in vitro*; and
transplanting the embryo into a recipient female bovine parent, which gestates the embryo to give birth to a transgenic bovine.

125. (Amended) [A transgenic bovine produced by] [t]The method of claim 123 wherein the transgene comprises [having a genome containing a transgene comprising]:

a mammary-gland specific promoter;

a mammary-gland specific enhancer;
a secretory DNA sequence encoding a signal sequence functional in bovine mammary secretory cells;
a recombinant DNA sequence encoding a recombinant polypeptide, the secretory DNA sequence being operably linked to the recombinant DNA sequence, wherein a secretory recombinant DNA sequence is formed, the secretory-recombinant DNA sequence being operably linked to the promoter and enhancer;
wherein the transgene, in a lactating form of the transgenic bovine or a female descendent of the transgenic bovine, is capable of directing the expression of the secretory-recombinant DNA sequence in bovine mammary secretory cells to produce a form of recombinant polypeptide, that when secreted from the mammary secretory cells produces the recombinant polypeptide in the milk of the bovine or female descendent thereof.

126. (Amended) The [transgenic bovine] method of claim [124] 123, wherein the transgene is introduced into the zygote by microinjection.

Please add the following claim.

128. A method of producing an embryo of a transgenic bovine species, comprising:

obtaining an ovum from bovine ovaries;
maturing and fertilizing the ovum *in vitro* to form a zygote;
introducing a transgene into the zygote, wherein the transgene integrates into the genome of the zygote to form the transgenic embryo.

Remarks

Preliminary

With the exception of new claim 128, all claims are now dependent directly or indirectly on claim 123. Claim 123 is direct to an *in vitro* method of producing a transgenic bovine species. The claim specifies that steps of maturing an oocyte, fertilizing the oocyte to produce a zygote, introducing a transgene into the zygote and maturing the zygote to an embryo are conducted *in vitro*. Support for the step of maturing an